Amphibians, Adaptations, and ATVs

For use with: Arizona Wildlife Views Television Show, 07-08 Season, Episode 10

Adaptations **Time Frame:** 1 day **Grade:** 4-8

Overview:
The majority of this video focuses on the unique toads that inhabit the Sonoran desert. In addition, there is a segment about the ATV Jamboree in northeastern Arizona and one on the elegant trogon. The lesson focuses on desert adaptations. Students will use common materials to develop a simulation that tests the effectiveness of water conservation adaptations.

Essential Questions
- What adaptations allow organisms to survive in harsh environments?
- What place does creativity have in science?

Objectives
- Describe adaptations that allow amphibians to survive in the Arizona desert.
- Use common household materials to simulate water conservation adaptations.

Arizona Department of Education Standards

Science

4th grade	5th grade	6th grade	7th grade	8th grade
S1-C2-PO4 S4-C4-PO1 S4-C4-PO2	S1-C2-PO4 S3-C1-PO3	S1-C2-PO4 S4-C1-PO1	S1-C2-PO4 S4-C3-PO2	S1-C2-PO4 S4-C4-PO1

Materials and Resources
- Copy of Arizona Wildlife Views episode
- Dry sponge (1 per group)
- Small bowl (1 per group)
- Measuring cup
- Water
- Collection of household materials (i.e., aluminum foil, wax paper, popsicle sticks, string, etc.)

Teacher Preparation
- Acquire a copy of the television show. You can check local listings to determine when it will air and record it directly. You may also check the Department's web site to see if a copy can be downloaded or ordered.
- Write the vocabulary words and questions on the board.
- Gather some common household materials that students can use to create their sponge "adaptations." Be creative. Make sure to provide the students with a lot of choices. They do not have to use all of the materials.

Background Information:
This is not a lesson plan in the traditional sense. It does not provide step-by-step directions for completing an activity. Instead, it provides information to help you use an episode of the *Arizona Wildlife Views* television program in your classroom. It contains four suggested activities along with extensions and modifications. The first activity focuses on vocabulary. We have provided and defined some of the words used in the video. You are encouraged to use any appropriate strategies to introduce these to your students. Then, there is a series of comprehension questions that students can answer while watching the video. Answers (directly from the video) are provided in italics. Next, the critical thinking questions build on the major concepts introduced in the video. Students need to put a little bit more thought into these questions. Some reasonable answers are provided in italics. However, teachers should be cautious and realize that

students may provide additional answers that can be supported with evidence. Finally, there is an in-depth activity. This activity allows students to evaluate and synthesize one or more of the concepts from the video, perhaps applying it to a new context or utilizing additional skills.

This episode originally aired on PBS (KAET, Channel 8) in Phoenix on April 13, 2008. It may also be shown on regional PBS stations or other channels. For additional viewing information or download options, please visit **http://www.azgfd.gov/focuswild**.

Additional information about the animals featured in this episode can be found at:

- ✓ Great Plains Narrow Mouthed Toad: http://www.azgfd.gov/w_c/nongame_greatplains_narrowmouth_toad.shtml
- ✓ Reptile and Amphibian Accounts: http://www.desertmuseum.org/books/nhsd_reptile.php
- ✓ Amphibians of Arizona: http://www.reptilesofaz.com/herp-amphibians.html
- ✓ Off-Highway Vehicles: http://www.azgfd.gov/outdoor_recreation/off_highway.shtml

In addition, the Field Guide to Amphibians and Reptiles in Arizona provides excellent information and photographs of the toads discussed in the episode as well as all of the reptiles and amphibians found in the state. This book can be purchased at all Arizona Game and Fish Department offices, through most major booksellers, and from the Department's publications web site: http://www.azgfd.gov/i_e/pubs/publications.shtml

Relevant Vocabulary:

- o Arid – extremely dry, with little rainfall
- o Desiccation – the drying out of an organism
- o Estivate – to sleep or hibernate during the summer
- o Etiquette – acceptable or appropriate behavior
- o Genetic fitness – an individual's ability to reproduce and pass on genes and traits
- o Growth inhibitor – a chemical that slows the growth of other organisms
- o Neurotoxin – a chemical that damages the nervous system
- o Spade – a digging tool
- o Tubercle – a hard, wartlike bump
- o Turbid – cloudy or muddy

Comprehension Questions:

1. How many species of spadefoot toads are found in Arizona? *Answer: 4.*
2. What is the largest native Arizona toad? *Answer: Colorado River Toad (or Sonoran Desert Toad).*
3. What is the most widely distributed amphibian in Arizona? *Answer: Red-spotted Toad.*
4. What is a satellite toad? *Answer: A male toad that doesn't call. Instead, it sits near a calling male and tries to steal away any female that responds to the calling male.*
5. How far away can the Great Plains toad be heard? *Answer: 4 miles.*
6. What toad has been seen sharing a burrow with tarantulas? *Answer: Narrow mouthed toad.*
7. Name three pieces of recommended gear that you should wear when riding ATVs. *Answer: Helmet, goggles or other eye protection, gloves, long-sleeved shirt, long pants, and boots that cover the ankle.*
8. Between 2000-2004, how many deaths are attributed to ATVs across the country? *Answer: 2,500.*
9. How many elegant trogons migrate to the United States every year? *Answer: About 200.*
10. How much money does birdwatching and other watchable wildlife activities contribute to the state's economy each year? *Answer: $1.5 billion.*

Critical Thinking Questions:

1. In the arid deserts of Arizona, as many as seven different species of amphibians have been observed living in the same small mud puddle. Why do you think these animals live in such crowded conditions? *Answer: In the Arizona deserts, water is a precious commodity. With so few sources of water,*

the animals and plants have developed adaptations that allow them to make use of any amount that can be found. In this case, the amphibians have learned to cope with a smaller amount of space and more dense conditions. Their survival depends on it.

2. Describe some of the physical and behavioral adaptations that allow the spadefoot toads to survive in Arizona's deserts. *Answer: Spadefoot toads are highly adapted to survive in arid conditions. It burrows underground, a common adaptation in the desert. It has spade-shaped growths which allow it to dig quickly when the water dries up. It is able to survive for two years or more underground without water. The time it takes to move from egg to tadpole to adult is shortened to account for the ephemeral ponds on which it relies. In fact, the eggs only take 24 hours before they hatch and tadpoles are ready to leave the ponds seven days later.*
3. Some people have been critical that the ATV Jamboree may promote poor ATV etiquette and behavior. What are your thoughts? *Answer: The ATV jamboree provides an outlet for people to do some of the activities that they cannot legally do in the wild. These activities are performed in a controlled environment to prevent habitat destruction and prevent injuries. In the midst of all this fun, however, the organizers of the event put an emphasis on safety and education. ATV etiquette and laws are discussed and riders are encouraged to wear all safety gear before the sponsored trail rides take place. Overall, the ATV Jamboree encourages responsible off-highway recreation while allowing the participants to have some fun in the process.*

In-Depth Activity: The Desert Sponge

While hiking through the Arizona desert, you discovered a new animal. Because of its porous appearance, you decide to name the animal the Desert Sponge.

While observing the animal you learn that the animal must be outside for at least two hours every day in order to find enough food. Although you never observe it drinking, it always seems to be moist, as if it is capable of storing lots of water.

You are curious about how the Desert Sponge has adapted to conserve water. To find out, you decide to do a simulation using common household materials that have similar characteristics to those of the Desert Sponge.

Add two cups of water to a bowl. Soak a dry sponge in the water. After a few minutes, pour the remaining water into a measuring cup. How much water did your sponge absorb?

Using a variety of common materials (such as popsicle sticks and aluminum foil), develop "adaptations" for your sponge. Your goal is to prevent the sponge from losing water throughout the day.

Once your sponge has all of its "adaptations," place the sponge outside. Make sure you place it in a location where it will not be disturbed. At least once throughout the day, move your sponge into direct sunlight. Remember: it must spend at least two hours in the sun.

At the end of the day, squeeze the water from your sponge into the measuring cup. How much water is left in the sponge? How much water was lost throughout the day? How successful do you think your adaptations were? What changes would you make if you did the simulation again? What do you think would happen if your sponge was moved to a different environment? Would the adaptations help it survive?

Differentiated Instruction:

Extensions:

- **Language Arts:** Pretend you are a spadefoot toad. You have been underground for the past few months. Finally, you hear the roar of thunder and the patter of rain. The monsoon storms have begun and it is time for you to return to the surface. Write a story describing your experience.
- **Technology:** Use the Internet to research amphibians. What are the characteristics common to all amphibians? How many are found in Arizona? Are there any non-native amphibians in the state? If so, do they compete with the native ones? Which state has the most amphibians? Which state has the most endangered amphibians? What is the largest amphibian? What is the smallest? How are frogs and toads different? Which amphibians are dangerous to humans?

Modifications:

- Create a student handout with the vocabulary words and questions already provided.
- Provide students with the definitions and have them match them to the appropriate vocabulary words.
- Provide fill-in-the-blank responses for the Comprehension Questions, allowing students to listen for appropriate words to complete the sentences.

Reflection:

Use the space below to reflect on the success of the lesson. What worked? What didn't? These notes can be used to help the next time you teach the lesson. In addition, the Department would appreciate any feedback. Please visit **http://www.azgfd.gov/focuswild** and submit a lesson evaluation.